

WHAT IS CLAIMED IS:

1. A collision prediction device mounted on a own vehicle,  
comprising:

an image sensor unit that extracts an object on an image and  
5 detects a size and a position of an object on the image;

a millimeter-wave sensor unit that transmits a millimeter wave  
and detects a distance between the own vehicle and an object present  
in a sensing range;

a sensor matching unit that  
10 determines that the object detected by the image sensor  
unit is the same as the object detected by the millimeter-wave sensor  
when a change rate of a size of the object detected by the image  
sensor unit on the image is in disagreement with a change rate of a  
distance from the own vehicle to the object detected by the  
15 millimeter-wave sensor, and

when the objects are determined as identical, defines the  
object as a prospective collision obstacle, and calculates a relative  
position of the collision obstacle and the own vehicle after a  
predetermined time, based on the position detected by the image  
20 sensor unit and the distance detected by the millimeter-wave sensor  
unit; and

a collision prediction unit that predicts whether there is going to  
be a collision between the own vehicle and the collision obstacle from  
the position calculated by the sensor matching unit.

2. The collision prediction device according to claim 1, wherein the sensor matching unit calculates the position of the collision obstacle when the state of the collision obstacle and the own vehicle at the time of predicting the collision possibility is maintained during the  
5 predetermined time, as an estimate position of the collision predicted obstacle.

3. The collision prediction device according to claim 1, further comprising:  
10 a vehicle measurement unit that measures a yaw rate and a velocity of the own vehicle, and calculates a position of the own vehicle after the predetermined time, wherein  
the image sensor unit extracts an obstacle based on one or more of the velocity and the position of the own vehicle calculated by  
15 the vehicle measurement unit, and  
the millimeter-wave sensor unit calculates a relative velocity of the obstacle and the own vehicle, and extracts the obstacle based on the velocity of the own vehicle calculated by the vehicle measurement unit and the relative velocity of the obstacle and the own vehicle.

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4. The collision prediction device according to claim 1, wherein the collision prediction unit predicts that the collision is going to take place when the relative position is within a predetermined distance from the own vehicle within the predetermined time.

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5. The collision prediction device according to claim 1, further comprising:

a parameter setting unit with which a driver of the own vehicle can freely change the setting of both or any one of the predetermined  
5 time and the predetermined distance.

6. The collision prediction device according to claim 1, further comprising:

a warning notification unit that generates a warning when the  
10 collision prediction unit predicts that there is going to be the collision so that a driver of the own vehicle know about collision.

7. The collision prediction device according to claim 3, wherein the collision prediction unit predicts the collision based on the velocity of  
15 the own vehicle calculated by the vehicle measurement unit.

8. A method of predicting collision between a vehicle and an obstacle, comprising:

detecting an object on an image and detecting a size and a  
20 position of an object on the image;

detecting an object using a millimeter wave and detecting a distance between the vehicle and the object using the millimeter wave;

deciding whether the object detected on the image and the object detected using the millimeter wave are one and the same object  
25 when a change rate of a size of the object detected by the image

sensor unit on the image is in disagreement with a change rate of a distance from the own vehicle to the object detected by the millimeter-wave sensor;

defining, when it is decided at the deciding that objects are one  
5 and the same object, the object as a prospective collision obstacle;

calculating a relative position of the collision obstacle and the vehicle after a predetermined time, based on the position detected on the image and the distance detected using the millimeter wave; and

predicting whether there is going to be a collision between the  
10 vehicle and the collision obstacle from the relative position calculated.

9. A computer program for predicting collision between a vehicle and an obstacle using a computer, the computer program making the computer execute:

15 detecting an object on an image and detecting a size and a position of an object on the image;

detecting an object using a millimeter wave and detecting a distance between the vehicle and the object using the millimeter wave;

deciding whether the object detected on the image and the  
20 object detected using the millimeter wave are one and the same object when a change rate of a size of the object detected by the image sensor unit on the image is in disagreement with a change rate of a distance from the own vehicle to the object detected by the millimeter-wave sensor;

25 defining, when it is decided at the deciding that objects are one

and the same object, the object as a prospective collision obstacle;

calculating a relative position of the collision obstacle and the vehicle after a predetermined time, based on the position detected on the image and the distance detected using the millimeter wave; and

- 5        predicting whether there is going to be a collision between the vehicle and the collision obstacle from the relative position calculated.